

RETURN OF OAK WOODLAND

Josh Barraza (1,2), Adriana Briceño (1,2),

Eddie Sumano (1,2)

1. Pajaro Valley High School, Watsonville, CA

2. WATCH (Watsonville Area Teens Conserving Habitats) Program, Monterey Bay Aquarium

Introduction

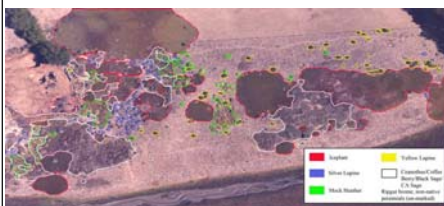
For centuries, people have moved plants around the world without understanding the consequences of their actions. Plants that have been introduced by immigrants are typically referred to as non-indigenous or invasive species, which have the ability to degrade natural habitats. Invasive plants have taken over our local Moss Landing dunes due to human disturbance in the past seven thousand years. Native Americans, Spanish, Mexicans, and Europeans all changed the California coast by bringing different plant species and harmful practices which disturbed the native vegetation and soil. The diverse habitat that once existed on Moss Landing Hill was eventually outcompeted by invasive plants. Fortunately, this area was restored and is now in the process of returning to its natural way! This is why we decided to restore another section located adjacent to the original Moss Landing Hill restoration. By following the methods that the original restoration group used, we started the process of what one day we hope will become an oak tree forest.



Methods

We were able to begin our fieldwork with help from one of our mentors, Peter Slattery, who was the director of the previous Moss Landing restoration. Peter helped by teaching us about succession, plant propagation, and about the different methods that were used on his restoration.

We used the Global Information System (GIS) to view the effects of the previous restoration. The GIS gave us an idea of how many invasive and native plants there were/are in the Moss Landing Hill restoration. Our Mentor Linda Kuhn gave us large aerial pictures that we colored based on plant type. Each different color and shape determined a different plant. We were not able to identify all of the plants in our perspective but with the help of our mentor we got the percentages and the exact names of the plants that were at the location during the time that the aerial picture was taken. The dates for the pictures were taken in the years 1997, 1999, 2000, 2009. An example of a finished picture is in Figure 1.



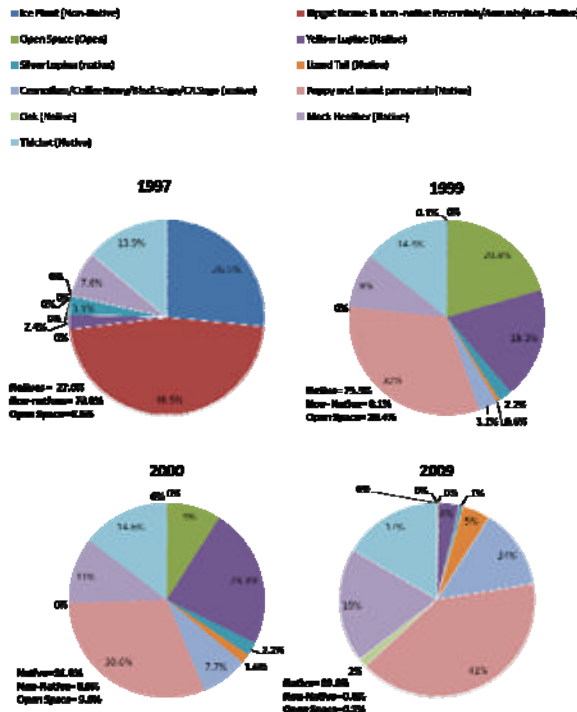
•Figure 1: Moss Landing Hill 1997 Global Information System

During our research out in the field, we planted approximately 126 native plants during the rainy season. We chose to plant during this season because plants need a lot of water in order to survive! The plants consisted of mostly early colonizers and nitrogen fixers so they would be able to have positive impacts on the habitat. Some of these colonizers and nitrogen fixers were: Coffee Berry, Yellow Lupine, and Coyote Bush. The technique that we used for planting these natives was to first dig a hole about a foot deep and a foot wide. We then had to place the plant inside the hole and had to strike the soil with our hand as hard as we could to make sure that the roots and soil made contact. Next, we filled the hole with the leftover soil that we had taken out when we began making the hole. We followed the same steps for the entire 126 native plants that were planted in just 3 days of field work in an area of 10,680 square feet.

Results

As a result, we observed that in 1997 on Moss Landing Hill there was 73% Non-Native and only 27% native plants. In only 2 years there was a drastic change in vegetation. In 1999 there was only 0.1% Non-Native and 79.5% native plants. One year later, in 2000, all of the non-Native plants were gone. The results then were 91% native plants and 9% open space. In our most recent information that we have available, 2009, there was 99.8% of native plants and 0.2% of open space. These results show us that the restoration on Moss Landing Hill was successful.

Plants present from 1997-2009 at Moss Landing Hill



•Figure 3 (above): The graphs above show the non-native plants being whiped out within three years.



•Figure 2: Model of succession. Continuing to model succession throughout the next couple of years will result in an oak woodland.

Materials

Shovel: to make the holes to get started with planting our plants.
Native Plants: Yellow Lupine, Coffee Berry (*Rhamnus californica*), Coyote Bush (*Baccharis pilularis*), Ceanothus, California Sage Brush (*Artemisia californica*), Lizard Tail (*Eriophyllum staechadifolium*).
Water: to use for watering the plants and soil on our site.
Camera: to take pictures of us during our field work and also pictures of the plants and where we planted them.
Nokia Phones: to take pictures of us during our field work.
Measuring tape: to measure the area of our restoration site.
Flags: to mark all of the plants that we planted so we would be able to get the exact number of new natives on our site.
Poster Paper: to color in the aerial pictures
Sharpies: to color in the aerial pictures
GIS Program: to identify plants and the percentages of the plants.

Plant Population 2010

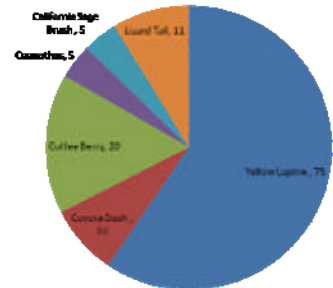


Figure 4: First step of succession at our restoration located adjacent to Moss Landing Hill restoration.

Conclusion

After our research, we came to the conclusion that the removal of invasive plants increases the percentage of native plants. Therefore, if done correctly, restoration can in fact make a remarkable difference in a habitat. We found that the key to a restoration is the process of succession. When the restoration plan models succession, it will facilitate the later stage of succession. It is what makes the fundamentals of plant propagation possible and the right way to make the most out of a restoration.

As for our restoration, we completed the first step of succession, which was planting early colonizers such as Yellow Bush Lupine. Due to the fact that succession is a long-term process, we will leave the rest to the next potential WATCH group. We hope to someday return and see an oak woodland.



Literature Cited

- B. Botkin, Daniel. A. Keller, Edward. Environmental Science Earth as a Living Plant. John Wiley & Sons, Inc., 2005.
- Slattery, Peter. "Building Site Sand Dune To Become A Natural Reserve"
- <http://watershed.csUMB.edu/ron/>. December- Recent 2009-2010
- <<http://watershed.csUMB.edu/ron/html/sub4/index.htm>>.

Acknowledgements

- Linda Kuhn
- Peter Slattery
- WATCH Staff
- Steven T. Hoy
- Elkhorn Native Plant Nursery

Blog

•<http://amje-returnofoakwoodland.blogspot.com>